

IN THE CLAIMS

1. (currently amended) A fiber optic wavelength switch comprising:

(a) a front-end unit having an input port and a plurality of output optical ports, said front-end unit comprising:

(i) a fiber array comprising a plurality of fibers coupled to the input port and the plurality of output optical ports for transmitting and receiving optical signals, respectively;

(ii) a micro-lens array having a plurality of micro-lenses, each micro-lens being coupled to a respective fiber; and

(iii) a lens for receiving and re-directing the optical signals from the micro-lens array;

(b) a wavelength dispersion element defining a dispersion plane for dispersing an input optical signal from the input port into a plurality of sub-beams with different central wavelengths;

(c) a spherical reflector for redirecting the input optical signal launched from the input port to the wavelength dispersion element, and for redirecting the sub-beams from the wavelength dispersion element back along spatially separated parallel paths ~~light redirecting element associated with the wavelength dispersion element;~~ and

(d) ~~an actuation array operative with the light redirecting element~~ for redirecting a selected plurality of sub-beams back to the spherical reflector in a plane ~~tilting the optical signals~~ substantially perpendicular to the dispersion plane defined by the wavelength dispersion element; whereby the selected plurality of sub-beams are redirected by the spherical reflector back to the wavelength dispersion element for recombination into a recombined output beam, which is redirected via the spherical reflector to one of the output ports.

2. (original) The fiber optic wavelength switch of claim 1, wherein the front-end unit further includes a polarization diversity module having at least one wave plate for splitting the optical signal into two sub-signals having substantially the same polarization state.

3. (currently amended) The fiber optic wavelength switch of claim 1, wherein the wavelength dispersion element includes one of a diffraction grating and a prism ~~and the light redirecting element includes a spherical reflector.~~

4. (original) The fiber optic wavelength switch of claim 1, wherein the actuation array includes a micro-electro-mechanical systems (MEMS) device, the MEMS device having a plurality of reflectors movable about an axis defined by the dispersion plane.

5. (currently amended) The fiber optic wavelength switch of claim 4, wherein a position of each of the plurality of output optical ports is related to an angular displacement of input and output sub-beams of light to and from the MEMS device, respectively.

6. (original) The fiber optic wavelength switch of claim 1, wherein the actuation array includes a liquid crystal deflection array having a plurality of pixels, each of the pixels having an optical phase array acting as an electro writable diffraction grating.

7. (currently amended) The fiber optic wavelength switch of claim 6, further comprising an addressing module for selecting an angle of deflection to provide a signal to one of the plurality of output optical ports.

8. (currently amended) An optical device for rerouting and modifying an optical signal comprising:

(a) a front-end unit having a first port for launching an input a beam of light, ~~and a second port for receiving a first output beam of light, and a third port for receiving a second output beam of light, said front-end unit comprising:~~

~~(i) a fiber array comprising a plurality of fibers coupled to the first port for transmitting beams of light and to the second port for receiving beams of light;~~

~~(ii) a micro-lens array having a plurality of micro-lenses, each micro-lens being coupled to a respective fiber; and~~

~~(iii) a lens for receiving and re-directing the beams of light from the micro-lens array;~~

(b) a light redirecting element having a focal plane for receiving the beam of light launched from the first port;

(c) a wavelength dispersion element defining a dispersion plane and disposed substantially at the focal plane of the light redirecting element for spatially dispersing the input a reflected beam of light from the light redirecting element into a plurality of sub-beams with different center wavelengths, and for redirecting the sub-beams spatially dispersed beam of light back to the light redirecting element; and

(d) an actuation array disposed at the focal plane of the light redirecting element for selectively redirecting at least one of the sub-beams back to the wavelength dispersion element via modifying the spatially dispersed beam of light reflected from the light redirecting element in a direction substantially perpendicular to the dispersion plane for recombination into the first output beam and output the second port, defined by the wavelength dispersion element and for selectively redirecting at least one of the sub-beams back to the wavelength dispersion element via reflecting the modified spatially dispersed beam back to the second port of the front end unit through the light redirecting element in a direction substantially perpendicular to the dispersion plane for recombination into the second output beam and output the third port and the wavelength dispersion element.

9. (currently amended) The optic device of claim 8, wherein the front-end unit further includes a polarization diversity module having at least one wave plate for splitting the input beam of light launched from the first port into two sub-beams having substantially the same polarization state.

10. (currently amended) The optic device of claim 9, wherein the wavelength dispersion element includes one of a diffraction grating and a prism; and wherein the light redirecting element includes a spherical reflector.

11. (original) The optic device of claim 9, wherein the actuation array includes a micro-electro-mechanical systems (MEMS) device, the MEMS device having a plurality of reflectors movable about an axis defined by the dispersion plane.

12. (currently amended) A method of rerouting and modifying an optical signal comprising:

- (a) launching an input a beam of light towards a reflecting element having a focal plane;
- (b) redirecting the input beam of light incident on the reflecting element to a dispersion element defining a dispersion direction, said dispersion element disposed substantially at the focal plane;
- (c) spatially dispersing the input ~~redirected~~ beam of light into a plurality of different sub-beams of light corresponding to a plurality of different spectral channels directed towards the reflecting element;
- (d) redirecting the plurality of different sub-beams of light incident on the reflecting element to an actuation array optically disposed substantially at the focal plane;
- (e) selectively redirecting at least one of the ~~modifying the plurality of different~~ sub-beams of light in a direction substantially perpendicular to the dispersion direction and reflecting them in a substantially backwards direction; and
- (f) redirecting the selectively redirected ~~modified plurality of different~~ sub-beams to the dispersion element and combining them to form an output beams of light.

13. The method of claim 12, wherein the step of launching includes receiving the input beam of light in a micro-lens, and redirecting the input beam of light from the micro-lens using a lens to direct the input beam of light to the reflecting element.

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